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EXAMINER	
LI, SHI K	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/936,074	HABER ET AL.	
	Examiner	Art Unit	
	Shi K. Li	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *187-209,212,213,215,218-221,223,227,231,232 and 237-258* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *187-209,212,213,215,218-221,223,227,231,232 and 237-258* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand (U.S. Patent 6,239,888 B1) in view of Kawasaki et al. (U.S. Patent 6,288,836 B1).

Regarding claims 187 and 240, Willebrand discloses in FIG. 1 an optical network with fiber links 26 and free-space links 24. Willebrand teaches link head station 22a with optical link 24 and fiber links 26. Willebrand teaches in FIG. 10 a structure for the link head station 22a comprising beam focusing element 32 for receiving an optical signal, fiber 34 for directing the received beam to an amplifier 36 for changing the amplitude of the optical signal and retransmitting the signal to, e.g., link head station 22h of FIG. 1. Willebrand teaches to adjust the amplifier to obtain a desirable output power level. The difference between Willebrand and the claimed invention is that Willebrand does not teach attenuating amplitude. Kawasaki et al. teaches in FIG. 7 and col. 6, line 62-col. 7, line 5 that it is desirable to control the pump power of a amplifier such that the wavelength characteristic of gain becomes flat and control a variable attenuator to maintain a constant power output. One of ordinary skill in the art would have been motivated to combine the teaching of Kawasaki et al. with the optical network of Willebrand because using an amplifier and an attenuator allows controlling the pump diode of the amplifier

to give a flat gain characteristic and controlling the attenuator to maintain a constant power output. This gives both a flat gain characteristic and constant output. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the EDFA in FIG. 10 of Willebrand with an amplifier and an attenuator, as taught by Kawasaki et al., because it allows separate control of the pump diode of the amplifier to give a flat gain characteristic and control of the attenuator to maintain a constant power output.

Regarding claims 188-189, Willebrand teaches in col. 11, lines 33-37 that adaptive power control overcomes attenuating atmospheric conditions.

Regarding claim 190, Kawasaki et al. teach in FIG. 15 to determine the average power per channel for adjusting the attenuator.

Regarding claim 191, Kawasaki et al. teaches in FIG. 7 to continuously monitor the momentary power level.

Regarding claim 192, Kawasaki et al. teaches in FIG. 7 to extract a portion of the received beam using coupler 32 and 42 and light detectors 38 and 44.

Regarding claim 193, Kawasaki et al. teaches in FIG. 7 to extract portion of light beam after it has been variably changed.

Regarding claim 194, Kawasaki et al. teaches in col. 7, lines 33-35 that the optical signal is maintained at a constant power level.

Regarding claim 197, Kawasaki et al. teaches in FIG. 7 amplifying optical signal amplitude by an optical amplifier.

Regarding claim 199, Kawasaki et al. teaches in FIG. 7 amplifying optical signal amplitude by an optical amplifier.

Regarding claim 200, Kawasaki et al. teaches in col. 7, lines 33-35 the amplifier maintains constant gain.

Regarding claim 201, Willebrand teaches in FIG. 1 mountain 29, which indicates that the signal passes through outdoor transmission path.

Regarding claims 202-203, Willebrand teaches in FIG. 1 mountain 29, which suggests that the distance between link head stations may be 1000 meters or more.

Regarding claim 205, Willebrand teaches in col. 3, lines 60-67 wavelength division multiplexing technique.

Regarding claim 207, Kawasaki et al. teaches in FIG. 13 automatic gain control.

Regarding claim 213, Kawasaki et al. teaches in FIG. 13 control circuit and supervising circuit for controlling substantially constant average amplitude.

Regarding claim 231, Willebrand teaches in FIG. 1 that link head station, e.g., 22a, retransmits processed light beams to other link head stations, e.g., 22h.

Regarding claim 232, Willebrand teaches in FIG. 1 that link head station, e.g., 22f, retransmits processed light beams to other link head stations, e.g., 22j, over atmosphere.

Regarding claim 241, Willebrand teaches in col. 3, lines 60-67 wavelength division multiplexing technique.

Regarding claims 242-243, Kawasaki et al. teaches in col. 7, lines 33-35 that the optical signal is maintained at a constant power level.

Regarding claim 244, Kawasaki et al. teaches in FIG. 7 optical attenuator 28.

Regarding claim 227, Kawasaki et al. teaches in col. 7, lines 33-35 that the optical signal is maintained at a constant power level.

Regarding claim 247, Willebrand teaches in FIG. 1 mountain 29, which suggests that the distance between link head stations may be 100 meters or more.

Regarding claim 248, Kawasaki et al. teaches in FIG. 7 optical attenuator 28 and optical amplifier 30 arranged in series.

Regarding claim 249, Kawasaki et al. teaches in col. 6, line 62-col. 7, line 5 that the pump power is set to a target value for gain flat characteristic and control the attenuator for maintaining constant power. That is, the pump power is relatively stable and the attenuator is adjusted for compensating fluctuation.

Regarding claims 250-251, Kawasaki et al. teaches in FIG. 7 automatic gain control.

Regarding claim 254, the modified optical network of Willebrand and Kawasaki et al. teaches receiving light beam through atmosphere (link 24 of FIG. 2 of Willebrand), directing received beam into a fiber (34 of FIG. 2 of Willebrand), passing the received beam through optical amplifier (e.g., 30 of FIG. 7 of Kawasaki et al.) and optical attenuator (e.g., 28 of FIG. 7 of Kawasaki et al.).

Regarding claims 219 and 237, Willebrand teaches in col. 3, lines 60-67 wavelength division multiplexing technique.

Regarding claim 255, Kawasaki et al. teaches in FIG. 10 to change the order of the amplifier and the attenuator.

Regarding claim 256, Kawasaki et al. teaches in col. 6, line 62-col. 7, line 5 that the pump power is set to a target value for gain flat characteristic and control the attenuator for maintaining constant power. That is, the pump power is relatively stable and the attenuator is adjusted for compensating fluctuation.

Regarding claim 257, Kawasaki et al. teaches in col. 7, lines 33-35 the amplifier maintains constant gain.

Regarding claim 258, Kawasaki et al. teaches automatic gain control.

3. Claims 195-196, 198, 208-209, 215 and 245-246 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand and Kawasaki et al. as applied to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258 above, and further in view of Okamura (H. Okamura, "Automatic Optical Loss Compensation with Erbium-Doped Fiber Amplifier", Journal of Lightwave Technology, Vol. 10, No. 8, August 1992).

Willebrand and Kawasaki et al. have been discussed above in regard to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258. Regarding claims 195-196 and 208, the difference between Willebrand and Kawasaki et al. and the claimed invention is that Willebrand and Kawasaki et al. do not teach a high change rate amplifier. Okamura teaches in FIG. 1 an optical amplifier with fast frequency response. Okamura illustrates in FIG. 13 that the amplitude changing rate is at least 1 KHz. One of ordinary skill in the art would have been motivated to combine the teaching of Okamura with the modified space communication system of Willebrand and Kawasaki et al. because the amplifier of Okamura can eliminate unwanted fast optical loss variation. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an optical amplifier with fast frequency response, as taught by Okamura, in the modified space communication system of Willebrand and Kawasaki et al. because the amplifier of Okamura can eliminate unwanted fast optical loss variation.

Regarding claim 198, Okamura teaches in FIG. 2 variable attenuator.

Regarding claims 209 and 245, Okamura teaches on page 1112, left col., last paragraph wavelength range of 1530-1570 nm.

Regarding claim 215, Okamura teaches in FIG. 13 that the output beam has substantially constant power.

Regarding claim 246, Okamura teaches in FIG. 13 a variation rate of 5 KHz.

4. Claim 204 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand and Kawasaki et al. as applied to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258 above, and further in view of Shen et al. (U.S. Patent 6,606,446 B1).

Willebrand and Kawasaki et al. have been discussed above in regard to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258. The difference between Willebrand and Kawasaki et al. and the claimed invention is that Willebrand and Kawasaki et al. do not teach the dynamic range of the attenuator. Shen et al. teaches in FIG. 2 a variable attenuator with a dynamic range of 35 dB (see col. 5, line 45). One of ordinary skill in the art would have been motivated to combine the teaching of Shen et al. with the modified optical network of Willebrand and Kawasaki et al. because the variable filter of Shen et al. is small and provides wide range of attenuation values. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the variable attenuator of Shen et al. in the modified optical network of Willebrand and Kawasaki et al. because the variable filter of Shen et al. is small and provides wide range of attenuation values.

5. Claims 206, 212, 221 and 252-253 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand and Kawasaki et al. as applied to claims 187-194, 197, 199-203,

205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258 above, and further in view of Kinoshita et al. (U.S. Patent 6,496,300 B2).

Willebrand and Kawasaki et al. have been discussed above in regard to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258. Regarding claims 206 and 252-253, the difference between Willebrand and Kawasaki et al. and the claimed invention is that Willebrand and Kawasaki et al. do not teach a single mode fiber. However, it is well known in the art to use single mode fiber for erbium doped fiber amplifier (EDFA). For example, Kinoshita et al. teaches in col. 1, lines 55-61 that EDFA uses a single mode optical fiber. One of ordinary skill in the art would have been motivated to combine the teaching of Kinoshita et al. with the modified space communication system of Willebrand and Kawasaki et al. because single mode fiber has minimal dispersion. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use single mode optical fiber for EDFA, as taught by Kinoshita et al., in the modified space communication system of Willebrand and Kawasaki et al. because single mode fiber has minimal dispersion.

Regarding claim 212, Willebrand teaches in col. 3, lines 60-67 wavelength division multiplexing technique.

Regarding claim 221, Kawasaki et al. teaches in col. 7, lines 33-35 that the optical signal is maintained at a constant power level.

6. Claim 218 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand, Kawasaki et al. and Shen et al. as applied to claims 204 above, and further in view of Okamura (H. Okamura, "Automatic Optical Loss Compensation with Erbium-Doped Fiber Amplifier", Journal of Lightwave Technology, Vol. 10, No. 8, August 1992).

Willebrand, Kawasaki et al. and Shen et al. have been discussed above in regard to claim 204. Regarding claims 195-196 and 208, the difference between Willebrand, Kawasaki et al. and Shen et al. and the claimed invention is that Willebrand, Kawasaki et al. and Shen et al. do not teach a high change rate amplifier. Okamura teaches in FIG. 1 an optical amplifier with fast frequency response. Okamura illustrates in FIG. 13 that the amplitude changing rate is at least 1 KHz. One of ordinary skill in the art would have been motivated to combine the teaching of Okamura with the modified space communication system of Willebrand, Kawasaki et al. and Shen et al. because the amplifier of Okamura can eliminate unwanted fast optical loss variation. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an optical amplifier with fast frequency response, as taught by Okamura, in the modified space communication system of Willebrand, Kawasaki et al. and Shen et al. because the amplifier of Okamura can eliminate unwanted fast optical loss variation.

7. Claim 220 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand, Kawasaki et al. and Kinoshita et al. as applied to claims 206, 212, 221 and 252-253 above, and further in view of Shen et al. (U.S. Patent 6,606,446 B1).

Willebrand, Kawasaki et al. and Kinoshita et al. have been discussed above in regard to claims 206, 212, 221 and 252-253. The difference between Willebrand, Kawasaki et al. and Kinoshita et al. and the claimed invention is that Willebrand and Kawasaki et al. and Kinoshita et al. do not teach the dynamic range of the attenuator. Shen et al. teaches in FIG. 2 a variable attenuator with a dynamic range of 35 dB (see col. 5, line 45). One of ordinary skill in the art would have been motivated to combine the teaching of Shen et al. with the modified optical network of Willebrand, Kawasaki et al. and Kinoshita et al. because the variable filter of Shen et

al. is small and provides wide range of attenuation values. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the variable attenuator of Shen et al. in the modified optical network of Willebrand, Kawasaki et al. and Kinoshita et al. because the variable filter of Shen et al. is small and provides wide range of attenuation values.

8. Claim 223 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand, Kawasaki et al. and Kinoshita et al. as applied to claims 206, 212, 221 and 252-253 above, and further in view of Masuda et al. (H. Masuda et al., "Wideband, Gain-Flattened, Erbium-doped Fiber Amplifiers with 3dB Bandwidths of > 50 nm", Electronics Letters, Vol. 33, No. 12, 5th June 1997).

Willebrand, Kawasaki et al. and Kinoshita et al. have been discussed above in regard to claims 206, 212, 221 and 252-253. The difference between Willebrand, Kawasaki et al. and Kinoshita et al. and the claimed invention is that Willebrand, Kawasaki et al. and Kinoshita et al. do not teach a bandwidth of at least 40 nm. Masuda et al. discloses in FIG. 1 an EDFA with a bandwidth of at least 50 nm. One of ordinary skill in the art would have been motivated to combine the teaching of Masuda et al. with the modified optical space communication system of Willebrand, Kawasaki et al. and Kinoshita et al. because an EDFA with wider bandwidth can accommodate more wavelength channels. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the EDFA of Masuda et al. in the modified optical space communication system of Willebrand, Kawasaki et al. and Kinoshita et al. because an EDFA with wider bandwidth can accommodate more wavelength channels.

9. Claims 238 and 239 rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand and Kawasaki et al. as applied to claims 187-194, 197, 199-203, 205, 207, 213, 219,

227, 231-232, 237, 240-244, 247-251 and 254-258 above, and further in view of Jackel (U.S. Patent 6,175,436 B1).

Willebrand and Kawasaki et al. have been discussed above in regard to claims 187-194, 197, 199-203, 205, 207, 213, 219, 227, 231-232, 237, 240-244, 247-251 and 254-258. The difference between Willebrand and Kawasaki et al. and the claimed invention is that Willebrand and Kawasaki et al. do not teach a saturated optical amplifier. Jackel teaches in col. 3, lines 4-14 that it is desirable to operate an EDFA in saturation due to signal-to-noise ratio consideration and clamped output level. One of ordinary skill in the art would have been motivated to combine the teaching of Jackel with the modified optical space communication system of Willebrand and Kawasaki et al. because of the said advantages. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to operate a EDFA in saturation, as taught by Jackel, in the modified optical space communication system of Willebrand and Kawasaki et al. because it gives better signal-to-noise ratio and clamps output power at a fixed level.

Response to Arguments

10. Applicant's arguments with respect to claims 187-209, 212-213, 215, 218-221, 223, 227, 231-232 and 237-258 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl
8 January 2006

M. R. SEDIGHIAN
PRIMARY EXAMINER